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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,525	07/01/2005	Wolfgang Paulus	13111-00021-US	9339
23416 7590 06/10/2009 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899				
EXAMINER				
UNDERDAHL, THANE E				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/535,525

Applicant(s)

PAULUS ET AL.

Examiner

THANE UNDERDAHL

Art Unit

1651

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 and 46-48 is/are pending in the application.
- 4a) Of the above claim(s) 38, 40 and 47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37, 39, 41, 42, 46 and 48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/08)
Paper No(s)/Mail Date 12/22/08.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Detailed Action

This Office Action is in response to the Applicant's reply received 3/19/09.

Claims 1-42 and 46-48 are pending. Claims 38, 40, 47 are withdrawn by election by original presentation. Claims 43-45 are cancelled. Claims 23, 25, 26, 37, 38, 40, and 41 have been amended. No Claims are new. Claims 1-37, 39, 41, 42, 46 and 48 are considered in this Office Action.

Election by Original Presentation

Newly amended and submitted claims 38, 40, and 47 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

These claims read on a subcombination of the method of claim 23. M.P.E.P. § 806.05(c) state:

The inventions are distinct if it can be shown that a combination as claimed:

(A) does not require the particulars of the subcombination as claimed for patentability (to show novelty and unobviousness), and

(B) the subcombination can be shown to have utility either by itself or in another materially different combination.

In the instant case amended claim 38 now requires that the acrylated polyol made via the method of claim 23 now be polymerized. The claim previously had this polymerization step as optional so the limitation was not considered in the previous Office Action. In addressing requirement (A) above, the method of claim 23 can be used to make acrylated polyols for various other purposes besides polymers such as unique molecular weight standards or nutritional supplements. In addressing requirement (B) above, the polymer made in claim 38 or claim 47 can have a utility as a

coating which is distinct from molecular weight standards or nutritional supplement for the product of claim 23.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 38, 40, and 47 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Applicant's Arguments— 35 U.S.C § 112

In the response submitted by the Applicant the 35 U.S.C § 112 rejection of claims 23, 29, 37, 38, 40 and 41 are withdrawn in light of the Applicant's amendment.

Response to Applicant's Arguments— 35 U.S.C § 102

In the response submitted by the Applicant, the 35 U.S.C § 102 (b) rejection of claims 23, 24, 26-33, 35-37, and 41 over Brown et al. were considered but not found persuasive.

The Applicant argues that the new limitation that the acrylated polyols are now incompletely acrylated polyols limits the claims to outside the teachings of Brown et al. However "incompletely acrylated polyols" is an intended result and not an active step of the method. Any art disclosing the same steps as the proposed method will either inherently meet this limitation since the same method steps lead to the same end product (M.P.E.P. § 2112.02). Indeed the Applicant did not change any of the method steps to indicate that the end result is incompletely acrylated polyols.

The Applicant argues that Brown et al. "does not address the problem of specifically preparing incompletely acrylated polyols by means of enzymes" and that Brown et al. hydrogenates the acrylated polyol and thus is not applicable as a polymerizable polyol. Initially the Examiner notes that polymerization is not a step in the method until claim 39, which was not considered in this rejection. Therefore this argument is not commensurate with the scope of these claims. Furthermore, as stated above "incompletely acrylated polyols" is an intended result derived from the steps, and Brown et al. does teach the steps of claim 23.

However the Applicant argues that since Brown et al. takes the additional step of hydrogenating their acrylated polyol they do not read on the invention. However the Applicant uses the open claim language of comprising, and as such additional steps in the prior art do not exclude it reading on the claimed invention. Furthermore the hydrogenation step of Brown et al. takes part in a separate part of their apparatus (see Col 15, lines 65-70 and Figure 1, #130) and the acrylated polyol must be transported to the hydrogenator. Therefore since before the transport to the hydrogenator Brown et al. teaches the claim steps they have the claim product and it is the steps that lead up to the hydrogenation that anticipate the claims. M.P.E.P. § 2112.02 is very clear that a device that carries out the process through its normal operation will anticipate the claim.

Therefore the rejection stands and is repeated below with additional editing to address the amendments to the claims.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 23, 24, 26-33, 35-37, 41 and 48 remain rejected under 35 U.S.C. 102(b) as being anticipated by Brown et al. (U.S. Patent # 5288619).

These claims are drawn to the method of enzymatically synthesizing incomplete polyol acrylates. An aliphatic polyol is reacted with an acrylic acid compound or alkyl ester of an acrylic acid in a liquid medium comprising an organic solvent in the presence of hydrolases that transfer acrylate groups. The liquid medium contains less than about 10% by volume water. The acrylic acid compound and polyol are used in a molar ratio of 100:1 to 1:1. The acrylic acid compound can be simply an acrylic acid, lower-alkyl-substituted acrylic acid or alkyl ester thereof. The polyol can be a variety of compounds including glycerol, diglycerol or sugars such as sorbitol and mannitol. The solvent can be selected from THF or various other ethers such as diethyl ether. The reaction temperature is from 0 to about 100 °C. The phase of the reaction can be single or multiphased with the reactants in suspension or emulsion. Also water is removed from the solution during transesterification.

Brown et al. teach a process for the enzymatic synthesis of polyol acrylates by reacting an aliphatic polyol such as glycerol, diglycerol, triglycerol as well as the sugars of mannitol, adonitol, sorbitol and xylitol and many others (col 18, lines 35-50) with an acrylic acid compound such as acrylic acid or ethyl or allyl acrylate (col 18, lines 33-35)

with an enzyme such as esterases, lipases and acyltransferases (col 18, lines 46-47). The solvent may be hexane (col 32, lines 29), ether (col 20, lines 5-10) THF (col 18, line 45) or pyridine (col 10, line 17). The reaction temperature can be from 35-60 °C (col 12, lines 15-20). The reaction mix contains between 0.01 to 5% water (col 35, lines 5-6). The reaction can be single-phased (col 75, Example 3) or an emulsion (col 66, lines 25-30). Water is removed from the reaction via molecular sieves (col 67, lines 30-35) or counter-current diffuser (col 19, lines 20-23).

Therefore the reference anticipates claims 23, 24, 26-33, 35-37, 41, and 48.

Response to Applicant's Arguments— 35 U.S.C § 103

In the response submitted by the Applicant, the 35 U.S.C § 103 (a) of claims 23-37, 41 and 42 over Brown et al. were considered but not found persuasive.

Applicants rely on the arguments used in traversing the above 102(b) rejection to also traverse this 103 (a) rejection without additional arguments. However, as explained above, the previous rejection stands. Therefore, the response set forth above to the arguments also applies to this rejection. Therefore the rejection stands and is repeated below with some editing to address the amended claims.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23-37, 41, 42, 46, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. as applied to 23, 24, 26-33, 35-37, 41, and 48 and in further view of the following rational.

The description and rejection of claims 23, 24, 26-33, 35-37, 41, 46 and 48 are listed in the 35 U.S.C § 102(b) rejection above. Claims 25, 34 42 and 46 limit the amount of the reactants such as the enzyme, polyol and acrylic acid compound used. While the reference listed above does not specifically teach the limitations, one of ordinary skill in the art would recognize these amounts of reactants are result effective variables. Absent any teaching of criticality by the applicant concerning these amounts it would be *prima facie* obvious that one of ordinary skill in the art would recognize these limitations are result effective variables which can be met as a matter of routine optimization (M.P.E.P. § 2144.05 II).

Therefore the references listed above renders obvious claims 23-37, 41, 42, 46, and 48.

In the response submitted by the Applicant, the 35 U.S.C § 103 (a) rejection of claims 23-37, 39, 41, 42 46, and 48 over Brown et al. as applied to claims 23-37, 41, 42, 46, and 48 above, and further in view of Pettrone et al. and Perner et al. were considered but not found persuasive.

The Applicant argues that the art of Pettrone et al. and Brown et al. is incompatible since Pettrone et al. teach a different enzyme class, specifically a transacylase instead of a hydrolase, from Brown et al. However as mentioned in the

previous action Brown et al. teach that their method can be accomplished with multiple enzymes including esterases, lipases and acyltransferases (Brown, col 18, lines 46-47). Furthermore Brown et al. already taught the use of a hydrolase and anticipates the method of claim 23. Pettrone et al. was cited to show these acrylated polyols can be polymerized a step that is separate from the acrylation of the polyol via esterases, lipases and acyltransferases. Indeed the claimed invention becomes obvious when the references are considered together as a whole rather than each alone.

The Examiner notes that the Perner et al. was not addressed in the Applicant's arguments. Therefor the rejection stands and is repeated below.

Claims 23-37, 39, 41, 42, 46, and 48 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. as applied to claims 23-37, 41, 42, 46, and 48 above, and further in view of Pettrone et al. (U.S. Patent # 5009805) and Perner et al. (U.S. Patent # 5009805).

The description and rejection of claims 23-37, 41, 42, 46, and 48 are listed in the 35 U.S.C § 102(b) and 103(a) rejection above. Claim 39 limits that the reaction product of polyol monoacrylates is reaction with a co-monomer to form a linear copolymer.

While Brown et al. teaches the production of a polyol monoacrylate he does not teach that these polyol monoacrylate can be polymerized with a co-monomer. However Pettrone et al. teaches, like Brown et al. that glycerol as well as other polyols (Pettrone col 6, lines 15-30) can be esterified with acrylates (Pettrone, col 5, lines 10-20) using the alternative enzyme transacylase (Pettrone, Abstract). Pettrone et al. teach that these products are polymerizable monomers (Pettrone, Abstract). While Pettrone et al.

does not teach that these products are polymerized to make co-monomers it is well established in the art that acrylate monomers are frequently used to make copolymers. One instance is given in the patent of Perner et al. who teach that the acrylate-polyol esters (col 3, lines 1-25) can be used to form copolymers (Perner et al. col 7-8 and Abstract). It would have been obvious to someone skilled in the art in view of the teachings above to meet the limitations of claim 39. Pettrone et al. teach similar acrylate-polyol esters to Brown et al. and that these esters can be polymerized. Perner et al. teach that copolymers can be made from acrylate-polyol esters. Therefore it would have been obvious to someone skilled in the art to combine known prior art elements of acrylate-polyol esters according to known methods of copolymerization to yield the copolymers limited in claim 39.

Therefore the references listed above renders obvious claims 23-37, 39, 41, 42, 46, and 48.

New Rejections Necessitated by IDS Submission

The art submitted with the IDS on 12/22/08 necessitated the following rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 23-27, 31-32, 35, 36, 41 and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Hajjar et al. (IDS, submitted 12/22/08).

Hajjar et al. teach reacting a liquid solution of 5 mmoles of a various diols (see Table I) with 106 mmoles of ethyl acrylate for a molar ratio between 100:1 to 1:1 at 30° C. (pg 826, Reaction Conditions). The enzyme they use to catalyze the reaction is lipase, identified as EC 3.1.1.3 (pg 826, Enzyme). The reaction temperature is They teach that the water content of the solvent is 0.1% w/v water.

Therefore the references anticipate claims 23-27, 31-32, 35, 36, 41 and 48.

No claims are currently allowed in this application.

Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 12/22/08 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

In response to this office action the applicant should specifically point out the support for any amendments made to the disclosure, including the claims (MPEP 714.02 and 2163.06). Due to the procedure outlined in MPEP § 2163.06 for interpreting claims, it is noted that other art may be applicable under 35 U.S.C. § 102 or 35 U.S.C. § 103(a) once the aforementioned issue(s) is/are addressed.

Applicant is requested to provide a list of all copending U.S. applications that set forth similar subject matter to the present claims. A copy of such copending claims is requested in response to this Office action.

CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thane Underdahl whose telephone number is (571) 272-9042. The examiner can normally be reached Monday through Thursday, 8:00 to 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached at (571) 272-0562. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thane Underdahl
Art Unit 1651

/Leon B Lankford/
Primary Examiner, Art Unit 1651